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## GUIDE TO PHOTOGRAPHY FROM COMMERCIAL AIRCRAFT

1. This paper is intended to serve as a guide in taking pictures of terrain areas from commercial aircraft with 35mm cameras. It is assumed that photography will be taken overtly by legal travelers who have little experience in this field.
2. Preferred Seating Position - In any aircraft the ideal position is in the pilot or copilots seat - but who has access? An unobstructed view of the ground should be considered - regardless of where the window seat is. Propeller arcs and engine exhausts are to be avoided.
3. Cameras - The camera should be of good quality and fitted with a first quality "fast" lens (f2 - f3.5) and be capable of a minimum of 1/500 second shutter speed. The camera and its accessories should be equivalent to the position and rank of the user - this to avoid attention.
4. Film - A good general purpose film, combining speed and a moderate grain pattern, is E. Kodak - PLUS - X - PAN. This film is factory rated at ASA 80 but can be exposed at an Exposure Index of 160 without altering the processing procedure. When light conditions are good - Adox KB17 (German) with an E.I. of 32, or E. Kodak Panatomic -X film (ASA 25) are excellent choices.
5. Filters - Haze is always a problem in air-to-ground photography. The use of a haze filter (also called a minus blur), or a K2 (yellow) or a G (orange) filter should be considered. If a K2 or G filter is used, the exposures must be increased by one and two "stops" respectively.

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6. Shutter speed - Photography from aircraft should utilize a wide aperture (suggest a "half stop" down from maximum) and the highest possible shutter speed - dependent upon the exposure required. Where possible, lens and shutter speed settings should be determined with the aid of an exposure meter prior to take off. Readings should be an average of dirt, grass and concrete. If the flight is long - a substitute reading can be taken directly from the palm of your hand during flight - holding your hand as close to the window as possible. In using Plus X Pan and a K2 filter on a clear day an approximate setting combination will be:

Focus - INFINITY ( $\infty$ )  
Lens Aperture - f4 (closed from f3.5)  
Shutter Speed - 1/500 second

NOTE: If, at the time a specific area of interest is seen cloud shadow is eminent, slow the shutter speed to 1/200 second.

7. Techniques of Exposing - In all aircraft it will be necessary to shoot through glass or plastic or both. The surface of the port should be wiped clean and avoid shooting through visible defects, i.e., bubbles, scratches, and striations. The lens should be held close to, and parallel to, the window pane as is feasible - this to minimize flare and reflections. Always be sure that the lens clears the bottom frame line of the port. Hold the camera firmly in both hands with the arms braced against the chest. Take a deep breath as you take your position and then, while sighting, release your breath just

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before the exposure is made. This procedure helps to eliminate camera movement. To minimize the transmission of aircraft vibration to the camera, sit on the forward edge of the seat, part of the weight supported on the balls of the feet, and no other part of the body touching the aircraft. When shooting from a standing position, as would be necessary in a lavatory, the legs should be slightly apart and the knees flexed to absorb sudden movement.

8. Whenever possible - two or more exposures should be taken of each target. This will produce stereoscopic pairs and permit examination of the target in three dimension. Care should be exercised in not including excessive empty sky and water.

9. Data - In order to extract the maximum information from the negatives, certain data must accompany the film.

a. Manufacturer, model and focal length of each lens used.

b. If the negative is not available the print should be "black bordered". Do not crop.

c. The date, time, and place of departure - and date, time, and place of arrival - including all stops should be recorded.

d. Date and exact time of each photograph attempt.

Items a and b are required for measurement procedures; c and d to determine the geographical position of the site. Any additional information observed by the photographer should be reported - or submitted. This could be maps, flight schedules, color of smoke etc.

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10. Extensive practice cannot be over emphasized. Many of the techniques and procedures can be practical on the ground. The goal for achievement should be that stage where little thought is required for setting and operating the camera. All attention can then be devoted to ground observance.

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GROUND PHOTO

1. Record the make, model and serial number of camera (for calibration shots).
2. Take calibration shots--R.R. tracks--camera horizontal and vertical.
3. Record focal length and serial number of lens.
4. Mark each roll of film, and, if possible, each exposure number (for reference).
5. Record date, time and camera pointing direction.
6. Under some circumstances, record the latitude and longitude.
7. Take one or more "long shots" of target area to show relationship to general area.
8. Take medium shots showing strategic parts of target--guard shacks, power lines, fences and gates, transformers, parking areas, R.R. tracks (move close, or use telephoto lens).
9. A partial panorama series should be made when possible, with an overlap of 30 to 40% for each succeeding photo.
10. Stereo pairs can be made with an ordinary camera by using a ratio 1:100 i.e. for every 100 feet of distance - there should be 1 foot between camera positions for each shot.
11. Stereo pairs can be made from a moving train or vehicle by shooting rapidly.
12. At industrial sites, note color of smoke, smell, color and size of nearby raw material piles.
13. Type and marking on R.R. cars, tankers, coal, oil, etc.
14. Individuals accessibility to target--closest distance possible.
15. Casing report prior to photo coverage is often essential if time w/camera is to be short.
16. From above information, determine the type of camera and lenses necessary.
17. If negative cannot be made available - print entire negative to show border area.
18. The desired print is flat, has little contrast, but excellent shadow detail.

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**A. Background:**

1. Educational or IQ level?
2. Previous training or experience?
  - a. How was training or experience acquired? Why? Personal interest or other reasons? Was camera used on trips?
3. How long at training or briefing did you have?
4. Who was the instructor?
5. What camera were you instructed in?
6. What lens did it have?
7. What film were you instructed in?
8. Was the film your choice or were you asked to use a certain film?
9. What meter were you instructed in?

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**B. Post Trip Questionnaire:**

1. What camera did you use?
2. How fast was the lens maximum aperture?
3. What meter did you use?
4. What film did you use?
5. Was this the camera, lens, meter and film you were trained in?
6. Why were you trained in the above?
7. What light and weather conditions did you encounter?
8. If you used the slow film, did you find it a handicap?
9. To what degree?
10. How many opportunities did you possibly miss because of light conditions beyond the range of slow film?
11. Could you have prevented misses with a faster film or lens?
12. How much faster film? Lens?
13. What ASA rating did you assign you film? Did you report this for each roll?
14. Was your camera mechanically checked before your trip?
15. Were there restrictions on what you could photograph?
16. Did you observe any surveillance either open or hidden?
17. Did you do your photography openly?
18. Was there curiosity about your equipment?
19. Could you have purchased equipment there? Film?
20. Did you have enough film?
21. Did you have film storage problems?
22. Did you have opportunities to copy documents?

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23. How valuable was your training?
24. Could you have benefitted with more training?
25. How much more?
26. Training on what specifically? Equipment? Techniques?
27. If you were to make another trip what would you do that you might not have done this time?

**C. Results:**

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